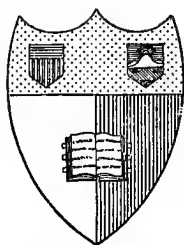


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**FIVE WAYS OF SAVING FUEL
IN HEATING HOUSES**

BY

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Therefore, in order that a fuel may be burned economically in a house-heating furnace, the fuel used should be of such kind that the fire requires little attention. The following fuels, in the order named, are the best fuels for house-heating purposes:

Anthracite coal in sizes from $\frac{1}{2}$ -inch to egg size.

Gas-retort or metallurgical coke in pieces $\frac{1}{2}$ inch to 3 inches across.

Coal briquets 2 to 3 inches in diameter.

Screened Pocahontas (semibituminous) coal over $\frac{1}{4}$ inch and through 3 or 4 inch screen.

Sized bituminous coal in pieces $\frac{1}{2}$ to 3 inches across.

If these fuels can be bought, fine sizes or slack coal or other fuels requiring frequent attention when burning should be left for power plants where the firemen can and should give the fires frequent attention.

2. USE AN ECONOMICAL METHOD OF BURNING YOUR COAL.

Because of the great variety of fuels used for house-heating purposes, and because of the great variety of house-heating equipment and conditions of operation, only the most general rules can be given for firing the fuel. The details must be determined by actual trial in each furnace.

The conditions under which house-heating apparatus is used are difficult to meet. The temperature of the house is to be kept uniform, with the firings far apart and with little attention given to the fires. The questions for each household to decide are: How much variation in the house temperature can be tolerated, and how much attention can be given to the furnace. The kind of heating apparatus has a great deal to do with the uniformity of the house temperature and the amount of attention that must be given to the fire. Hot-water systems will give much more uniform temperatures with less attention to the fires than hot-air systems. No one set of rules will work satisfactorily in all cases.

FIRING ANTHRACITE.

When firing anthracite, the best results are obtained by spreading the coal evenly over the entire fuel bed. The fire should not be allowed to become too low before putting on a fresh firing. A fuel bed 5 to 10 inches thick gives good results. The fire should be disturbed as little as possible.

FIRING BRIQUETS.

Briquets when properly made are very good fuel for house-heating purposes. However, the supply is decidedly limited. When burning

briquets the fuel bed should be kept 8 to 12 inches thick. The fresh charges should be spread evenly over the grate area. The fire must not be disturbed. Poking breaks the briquets and spoils the fire.

FIRING SEMIBITUMINOUS COALS.

The semibituminous coals of the Pocahontas type are good fuel for heating a house. They are nearly smokeless and make but little soot. For regular firing, the coal can be spread evenly over the entire fuel bed; or, it can be fired like bituminous coal, the fresh charges being placed alternately on one side of the grate and part of the surface of the fuel bed left uncovered. The alternate method should be used if the firings are heavy. The fire keeps better over night if the last firing is heaped to one side of the grate. Good results are obtained with fires 8 to 10 inches thick.

FIRING BITUMINOUS COALS.

The bituminous, or soft, coals are smoky and cover the flue surfaces with a large amount of soot and tar, which reduces the transfer of heat and impairs the draft. Bituminous coal should be fired by placing the fresh charge on one side of the grate only, leaving part of the surface of the fuel bed uncovered. The volatile matter rising from the freshly fired coal is ignited by the red-hot coal of the uncovered part of the fire and a large part of it burns.

If the entire surface of the fuel bed is covered with a heavy charge, the volatile matter from the fired coal does not ignite for a considerable length of time after firing and passes away unburned as tarry, greenish-yellow smoke. The furnace and the flues become filled with the smoke and when the fire finally works its way through the fresh layer of coal the smoke and the gases may ignite with an explosion violent enough to blow the pipes down and fill the house with smoke. These explosions are particularly apt to happen if the coal contains much slack; therefore, with such coal particular care should be taken that part of the bright fire remains uncovered. This method of firing reduces the amount of soot deposited in the flues so that less frequent cleaning is necessary; it also reduces the heat losses from incomplete combustion, thus directly effecting a saving of coal.

DRAFT REGULATION.

Draft regulation is perhaps the most important factor in burning coal efficiently in house-heating furnaces. The draft is regulated mainly with three dampers; one of these is on the ash-pit doors, one on the firing door, and one in the pipe connecting the furnace with the chimney. For many furnaces the damper in the flue pipe is an

opening covered with a hinged lid *A*, in figure 1. When this lid is closed the full chimney draft is effective in the furnace. When the lid is lifted, the chimney draws air from the cellar instead of drawing the gases out of the furnace, and the draft in the furnace is reduced almost to nothing. Between the two extremes any draft can be obtained by proper adjustment of the lid.

The damper *B* on the ash-pit door regulates the flow of air through the fire, and the amount of air flowing through the fire determines the rate of combustion, or the amount of coal that the furnace can burn in an hour. Therefore, to control the rate of combustion and thereby regulate the amount of heat the furnace delivers to the house, the furnace attendant adjusts the damper in the ash-pit door — and the damper to the chimney.

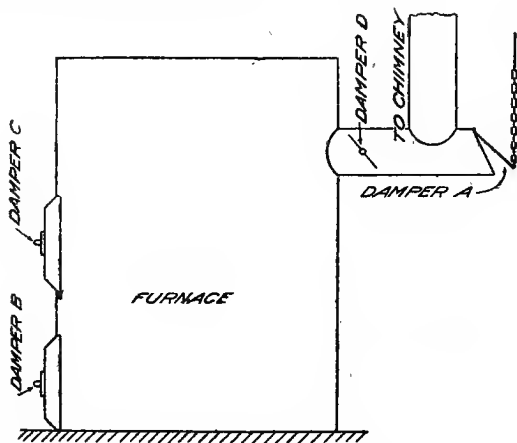


FIGURE 1.—Position of dampers in a house-heating furnace. Damper *A* regulates the draft in the furnace and should be used with dampers *B* and *C*. Damper *B* regulates the supply of air through the grate and the rate at which the coal burns. Damper *C* regulates the supply of air over the fire and the completeness of combustion. Damper *D* controls the draft and should be used with damper *A*.

The damper *C* in the firing door supplies air over fire needed to burn the gases rising from the fuel bed; therefore, its regulation controls the completeness of combustion of these gases. When soft coal is burned a large volume of combustible gases rises from the fuel bed immediately after the firing; therefore, the damper in the fire door must be opened enough to allow the air necessary for burning the gases to enter the furnace. After the smoky gases cease to rise from the freshly fired coal, the quantity of air supplied over the fuel bed can be reduced by partly closing the damper in the firing door.

There should be a damper, *D*, in the smoke pipe; this damper can be used in addition to damper *A* to control the draft.

No rule can be given for the exact adjustment of the dampers. The proper adjustment must be ascertained by trial; with a little

care and some patience the proper adjustment of the dampers of any furnace can be determined. In general, to make the fire burn faster, close the lid *A* (fig. 1) in the pipe leading to the chimney and open the damper *B* (fig. 1) in the ash-pit door. To make the fire burn slower, raise somewhat the lid in the check draft *A* and partly close the damper *B* in the ash-pit door. The damper *C* in the firing door is more difficult to adjust because there is no way to determine the completeness of combustion. In burning soft coal this damper should be slightly open all the time. In burning hard coal or coke enough air for complete combustion may enter the furnace through various leaks, even when the damper is completely closed.

3. KEEPING THE HOUSE TEMPERATURE LOWER.

In heating houses considerable fuel can be saved by keeping the temperature in the house 5° to 10° F. lower than is customary; instead of the temperature being between 70° and 74° F., it can be kept between 62° and 68° F. without any discomfort or any danger to health. In fact, some medical authorities ascribe the "colds" common in winter to living in too warm houses. Thus Dr. William Brady writes:

Air need never be heated above 65° F. for comfort. Anything above that point represents waste and extravagance. It simply runs up a big coal bill and opens various doors to the coming of the doctor. The onset of cough in winter is almost a sure sign of such extravagance.

Those interested in saving the country's fuel and lowering their own coal bills will be glad to know that keeping the house at 65° instead of 72° F. means a saving of 15 to 20 per cent of their fuel. It may also mean a saving on the doctor's bill.

Keeping the house temperature lower is the easiest way to save fuel. It is fuel saved by doing less work. As to the question of health, more sickness is caused by having a house too warm than by keeping it too cold.

4. HEATING FEWER ROOMS.

Another easy saving of fuel can be effected by heating fewer rooms in the house. In many houses the family can get along comfortably by keeping warm three or four rooms instead of heating six or seven rooms. And this can be done without any real hardship on the family. If one stops to think that 55 per cent of the families in Berlin, Germany, live, sleep, cook, and eat in the same room, living in three or four warm rooms will seem a comfort.^a Really only the three rooms in which the family lives need to be heated at all. If consumptives can get well by sleeping outdoors, why could not

^a Gerard, J. W., *My four years in Germany*. 1917.

well people keep well by sleeping in unheated bedrooms with the windows wide open?

5. SHORTENING THE HEATING SEASON.

In some homes the furnace is started too early in the fall and is run too late in the spring. The chimneys of these homes are belching smoke and spreading soot over their neighborhood, while the neighbors keep windows and doors open to the outside air and even sit on the front porches. These faint-hearted people in their fear of catching cold heat their houses unnecessarily; thus they waste the country's coal, increase their coal bills, invite sickness into their homes, and make life unpleasant to their neighbors. When mornings and evenings are chilly a grate fire for a short time in one or two rooms will make the house comfortable.

CONCLUSION.

Every householder by endeavoring to save coal in the ways suggested can render his country valuable service, and he will not be doing his full duty toward his country unless he renders such service as he can. In addition, he should remember that besides helping his country he will help to shorten the misery and the horror of the great war.

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